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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,733	07/16/2003	Modest Oprysko	YOR920030244US1 (163-6)	9039
24336	7590	07/26/2005	EXAMINER SEMENENKO, YURIY	
KEUSEY, TUTUNJIAN & BITETTO, P.C. 14 VANDERVENTER AVENUE, SUITE 128 PORT WASHINGTON, NY 11050			ART UNIT 2841	PAPER NUMBER

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,733

Applicant(s)

OPRYSKO ET AL.

Examiner

Yuriy Semenenko

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13-22 and 25-31 is/are rejected.
- 7) ☐ Claim(s) 11, 12, 23, 24, 32 and 33 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 16 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: ____.

DETAILED ACTION

Claim Objections

2. Claim 5 objected to because of the following informalities:

Should read "...includes two vias on each contact pad." instead of "...includes two vias each contact pad."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2.1. Regarding claims 11, 23, 32: Claims 11, 23, 32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In the disclosure, there are only one or two vias on the pad, which do not look like a pyramid. Unclear what is a pyramidal shape in the limitation "conductive structure includes a pyramidal shape having its base at the pads."

2.2. Regarding claim 13: The scope of the claim is indefinite. It is unclear where merely having vertical vias and horizontal conductors will give the desired function of impedance matching, or another additional structure not mentioned in the claim is needed to achieve this function.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3.1. Claims 1-4, 6, 16, 25-28 are rejected under 35 U.S.C. 102(e) as being anticipated by McCall et al. (Patent # 6700457) hereinafter McCall.

3.1.1. Regarding claim 1: McCall discloses in Fig. 2 an integrated circuit arrangement, comprising: a set of contact pads 26a-26e arranged in a pattern; a multi-layer conductive structure 56 which electrically connects the set of contact pads to at least one signal line 66a-66e; wherein the conductive structure provides impedance matching between the pads and the at least one signal line (column 3, lines 15-28).

3.1.2. Regarding claims 2, 26: McCall discloses an integrated circuit arrangement, as recited in claim 1 (25), wherein the set of contacts includes a row of spaced apart pads having a first pitch 26a, 26c, 26e (Fig. 2).

3.1.3. Regarding claims 3, 27: McCall discloses an integrated circuit arrangement as recited in claim 2 (26), wherein the signal line includes at least two signal lines 66A, 66B spaced apart having a second pitch (Fig. 2), wherein the conductive structure provides a smooth impedance transition between the signal lines and the pads (column 4, lines 33-40).

3.1.4. Regarding claims 4, 16, 28: McCall discloses in Fig.2 an integrated circuit arrangement as recited in claim 3 (15, 27), wherein the first pitch and the second pitch are standard pitches and the transition of the conductive structure enables operating frequencies 50% or more over standard via connections (column 5, lines 30-44).

3.1.5. Regarding claim 6: McCall discloses in Fig.13 an integrated circuit arrangement as recited in claim 1, wherein the conductive structure includes a conductor 66 disposed in a parallel orientation to a top surface of the pads 26, 36, and a via connecting the conductor to the signal line (column 6, lines 51-53).

3.1.6. Regarding claim 25: McCall discloses in Fig. 2, an integrated circuit package, comprising: a set of dielectric layers having a top surface; a top contact array on the top surface; a conductive structure 56 extending between the top contact array 26 and a set of output contacts 36, wherein a signal travels on a path from the top contact array 26 to the set of output contacts 36, and an impedance is balanced on the path of the signal in accordance with the conductive structure (column 3, lines 15-28).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter

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sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4.1. Claims 7-10, 13-15, 18-22, 29-31 are rejected under 35U.S.C. 103(a) as being obvious over McCall.

4.1.1. Regarding claim 13: McCall discloses in Fig. 2 An integrated circuit arrangement, comprising: a set of contact pads 26a-26e arranged in a pattern; a multi-layered conductive structure 56 which electrically connects the set of contact pads to at least one signal line 66a, wherein the conductive structure includes and horizontally disposed conductors 66 arranged to provide impedance matching between the pads and the at least one signal line,

except, McCall doesn't explicitly teach the conductive structure includes vertically disposed vias.

Applicant discloses in the "Background of the invention" section, at the time the invention was made, it was well know to use the conductive structure includes vertically disposed vias (page 6, line 15).

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for McCall to include in his invention the conductive structure includes vertically disposed vias.

Benefit of doing so is to provide pathway for transmitting high-speed signals.

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4.1.2. Regarding claims 7, 19, 29: McCall discloses in Fig. 2 the arrangement as recited in claim 1 (13, 25), wherein the contact pads 26 include a centrally disposed pad 26C and two pads 26A, 26E adjacent to the centrally disposed pad 26C, wherein the two pads connect to the conductive structure each by a conductor 66 disposed in a parallel orientation to a top surface of the two pads,

except, McCall doesn't explicitly teach that vias connecting each conductor to signal lines, wherein each conductor brings a connection point to a corresponding via closer to the centrally disposed pad.

Applicant discloses in the "Background of the invention" section, at the time the invention was made, it was well known to use such conductive structure, wherein vias 20, Fig. 2, connecting each conductor to signal lines 24, wherein each conductor brings a connection point to a corresponding via closer to the centrally disposed pad 16.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for McCall to include in his invention vias connecting each conductor to signal lines, wherein each conductor brings a connection point to a corresponding via closer to the centrally disposed pad

Benefit such structure is better condition for transmitting signals.

4.1.3. Regarding claims 8, 9, 20, 21, 30: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 7 (19, 29),

except, McCall doesn't explicitly teach that pads are in a row and the conductors are oriented in the row and centrally disposed pad includes a conductor, and the pads are in a row and the conductors and their corresponding vias are offset from a line in the row.

Applicant discloses in the "Background of the invention" section, at the time the invention was made, it was well known to use such conductive structure, wherein pads 16, Fig. 2, are in a row and the conductors 24, Fig. 2, are oriented in the row and centrally disposed pad includes a conductor, and the pads are in a row and the conductors and their corresponding vias are offset from a line in the row.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for McCall to include in his invention pads are in a row and the conductors

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are oriented in the row and centrally disposed pad includes a conductor, and the pads are in a row and the conductors and their corresponding vias are offset from a line in the row.

Benefit of doing so is shortest path for transmitting signals.

4.1.4. Regarding claims 10, 22, 31: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 1 (13, 25), includes conductors 66 disposed in a parallel orientation to a top surface of the pads,

except, McCall doesn't explicitly teach the conductive structure is multi-tiered and includes vias connecting the conductors to the signal line and the pads.

Applicant discloses in the "Background of the invention" section, at the time the invention was made, it was well known to use the conductive structure which is multi-tiered (page 6, lines 3-6) and includes vias 20, Fig. 2, connecting the conductors to the signal line 16, 24 and the pads 16.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for McCall to include in his invention wherein the conductive structure is multi-tiered and includes vias connecting the conductors to the signal line and the pads.

Benefit of doing so is to give opportunity to connect different type of chips to printed circuit board.

4.1.5. Regarding claim 14: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 14. And further the set of contact pads includes a row of spaced apart pads having a first pitch 26a, 26c, 26e (Fig. 2).

4.1.6. Regarding claim 15: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 14, wherein the signal line includes at least two signal lines 66A, 66B spaced apart having a second pitch (Fig. 2), wherein the conductive structure provides a smooth impedance transition between the signal lines and the pads (column 4, lines 33-40).

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4.1.7. Regarding claim 18: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 13, wherein the conductive structure includes the conductors 66 disposed in a parallel orientation to a top surface of the pads 26, 36.

4.2. Claims 5, 17 are rejected under 35U.S.C. 103(a) as being obvious over McCall in view of U. Ahmad et al. (Patent # 5436412) hereafter Ahmad.

4.2.1. Regarding claims 5, 17: McCall discloses in Fig. 2 the arrangement having all of the claimed features as discussed above with respect claim 1 (13), comprising: a set of contact pads 26a-26e arranged in a pattern,

except, McCall doesn't explicitly the conductive structure includes two vias on each contact pad.

Ahmad discloses in Fig. 2 conductive structure includes two vias 28 on each contact pad 24 (column 3, lines 50-55). Therefore, at time the invention was made, it was well know to use two vias on each contact pad.

Therefore it would have been obvious to one of ordinary skill in the art, at time the invention was made for McCall to include in his invention the conductive structure includes two vias on each contact pad.

Benefit of doing so is to provide possibility to transmit high-frequency signals.

Allowable Subject Matter

5. Claims 11, 12, 23, 24, 32, 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5.2. Regarding claims 11, 23, 32 : McCall discloses an integrated circuit arrangement, as recited in claim 10 (22, 31), comprising: a set of contact pads and a multi-layer conductive structure . But McCall doesn't teach the multi-tiered conductive structure includes a pyramidal shape having its base at the pads.

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5.3. Regarding claims 12, 24, 33: McCall discloses an integrated circuit arrangement, as recited in claim 10 (22, 31), comprising: a set of contact pads and a multi-layer conductive structure. But McCall doesn't teach multi-tiered conductive structure includes a plurality of vias at each connection point between conductors and/or pads wherein adjacent vias at a same tier are oriented one behind the other in a parallel direction with respect to the at least one signal line.

Relevant Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

6.1. S. Fazelpour (Patent #6617943) hereinafter Fazepour.

Fazelpour discloses package includes a multilayer substrate having an interconnect structure configured to propagate a high frequency signal from one metal layer to another metal layer. The configuration and the arrangement of the reference vias associated with the signal via, is selected such that a desired filter response is achieved.

6.2. S. Oggioni et al. (Patent #6710258) hereinafter Oggioni.

Oggioni discloses a multi-layered circuitized substrate for high-frequency applications. Conductive via-holes extend between two non-adjacent conductive layers for transmitting high-frequency signals therebetween. For each via-hole, shielding rings connectable to a reference voltage are provided, each ring formed in a corresponding intermediate conductive layer between the two non-adjacent conductive layers

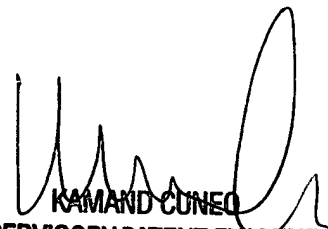
7.1. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yuriy Semenenko whose telephone number is (571) 272-6106. The examiner can normally be reached on 8:30am - 5:00pm.

7.2. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571)- 272-1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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7.3. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

YS



KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800